

REMARKS

Applicants respectfully request reconsideration of this application, and reconsideration of the Office Action dated July 30, 2003. Upon entry of this Amendment, claims 1-24 will remain pending in this application. The changes to the claims are fully supported by the specification and original claims. Claims 2, 10, and 17 have each been amended by incorporating into these claims all of the limitations of their respective base claims. Hence, the amendments to claims 2, 10, and 17 are in no way intended to narrow their original scope. In addition, payment to cover the cost associated with the additional independent claims is also submitted herewith.

Claims 4, 6, 12 and 19 have been amended to correct minor grammatical informalities. Likewise, no change is made to the scope of these claims.

Applicants gratefully acknowledge the Examiner's indication that claims 2-6, 10-14, and 17-21 contain allowable subject matter. While these claims were objected to, the Examiner indicated the claims 2-6, 10-14, and 17-21 would be allowable if rewritten in independent form including all of the limitations of their respective base claims and any intervening claims. In response, claims 2, 10, and 17 have been amended by incorporating into these three claims all of the limitations of their respective base claims. Claims 3-6 all ultimately depend from claim 2, claims 11-14 all ultimately depend from claim 10, and claims 18-21 all ultimately depend from claim 17. Hence, claims 2-6, 10-14, and 17-21 are all believed to be in condition for allowance.

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Claims 15 and 21 are rejected under 35 U.S.C. §102(b) as purportedly anticipated by Shah et al. (U.S. Patent 5,517,594). The Office Action asserts Shah describes every feature of claims 15 and 21. Applicants respectfully traverse.

Independent claims 15 and 21 describe a controller and method for controlling a heat treatment apparatus. The controller includes a control period determining unit for

determining a control period for periodically controlling the heater by the heating controller, based on a change rate of the set temperature. Likewise, the method includes a control period determining step of determining a control period for periodically controlling the heater by the heating control step, based on a change rate of the set temperature.

The Office Action asserts that the online model 30 of the reactor system described by Shah is equivalent to the control period determining unit. Applicants respectfully disagree. The online model of Shah obtains measurements from spike thermocouples and the profile thermocouples from the thermal reactor. The online model of Shah also obtains measurement of the thermal reactor input power to the thermal reactor. The online model implements a thermal model of the thermal reactor which generates estimated wafer temperatures from the thermal reactor power input and the spike and profile thermocouple measurements. See Column 4, Lines 5-20. In contrast, the Applicants' recited control period determining unit determines control periods based on a change rate of the set temperatures. As shown in Figure 6, the control period determining unit of the present invention determines a short control period when the temperature changes quickly and a long period when the temperature changes slowly. This allows the heating controller to efficiently control the heater. Shah fails to teach or fairly suggest the control period determining unit as described in the claims. Accordingly, Shah fails to teach or fairly suggest each and every feature of the present invention.

The above remarks overcome this rejection. Accordingly, reconsideration and withdrawal of the rejection is respectfully requested.

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Claims 1, 7-9, 16, 22, and 23 are rejected under 35 U.S.C. §102(b) as purportedly anticipated by Stoddard et al. (U.S. Patent 5,895,596). The Office Action asserts Stoddard

describes every feature of these claims. Applicants also respectfully traverse this rejection.

The Office Action asserts Stoddard shows a temperature estimator (98) for computing an estimated temperature of the object-to-be-processed, an error estimator (96) for computing an estimation error of the estimated temperature computed by the temperature estimator and a temperature corrector (112a-d) for computing a corrected estimated temperature. However, Applicants again disagree. In Stoddard, reference number "96" corresponds to a spike controller, reference number "98" corresponds to a profile controller, and reference numbers "112a-d" correspond to steps for creating off-line controller design model (power to spikes). Stoddard teaches that the spike controller (96) uses the difference between the spike setpoints and spike thermocouple measurements as inputs, and then outputs the power setpoints to the firing interface (108). The profile controller (98) uses the difference between the wafer setpoints and predictions of the on-line wafer temperature model as inputs and then outputs profile setpoints to profile controller (98). See Column 9, Lines 9-19. Accordingly, Stoddard merely discloses controllers for controlling the temperature of the wafers or controlling the power to a heater.

In contrast, the present invention estimates the temperature of the wafer and corrects the temperature of the wafer by using the estimation errors ΔT between the estimated temperature and the metered temperature in the vicinity of the wafer. Because the temperatures of the wafers themselves and the temperature in the vicinity of the wafers have close relationships with each other, it is possible to correct the estimated temperature of the wafer by using the estimation errors ΔT in the vicinity of the wafer. See Page 17, Line 25 to Page 18, Line 22 of the present specification. Stoddard fails to disclose "an error estimator for computing an estimation error of an estimated temperature computed by a temperature estimator" and "a temperature corrector for computing a corrected

estimated temperature given by correcting the estimated temperature computed by the temperature estimator, based on the estimation error computed by the error estimator” (as recited in each of independent claims 1, 9, and 16). Hence, Stoddard fails to teach or fairly suggest each and every feature of the claimed invention.

The above remarks overcome this rejection. Accordingly, reconsideration and withdrawal of the rejection is respectfully requested.

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Applicants respectfully submit that this Amendment and the above remarks obviate the outstanding objection and rejections in this case, thereby placing the application in condition for immediate allowance. Allowance of this application is earnestly solicited.

If any fees under 37 C.F.R. §§1.16 or 1.17 are due in connection with this filing, please charge the fees to Deposit Account No. 02-4300; Order No. 033082.103.

If an extension of time under 37 C.F.R. §1.136 is necessary that is not accounted for in the papers filed herewith, such an extension is requested. The extension fee should be charged to Deposit Account No. 02-4300; Order No. 033082.103.

Respectfully submitted,

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